



ENERGY NORTHWEST

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10 CFR 50.73

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397**
LICENSEE EVENT REPORT NO. 2007-004-00

Dear Sir or Madam:

Transmitted herewith is Licensee Event Report No. 2007-004-00 for Columbia Generating Station. This report is submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A). The enclosed report discusses items of reportability and corrective actions taken.

There are no new commitments being made. If you have any questions or require additional information, please contact Mr. GV Cullen at (509) 377-6105.

Respectfully,

DK Atkinson
Vice President, Nuclear Generation and
Chief Nuclear Officer

Enclosure: Licensee Event Report 2007-004-00

cc: BS Mallett – NRC RIV
CF Lyon – NRC NRR
INPO Records Center
NRC Sr. Resident Inspector – 988C (2)
RN Sherman – BPA/1399
WA Horin – Winston & Strawn
CE Johnson – NRC RIV/fax

IE22
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LICENSEE EVENT REPORT (LER)(See reverse for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Columbia Generating Station	2. DOCKET NUMBER 05000397	3. PAGE 1 OF 4
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4. TITLE
Reactor Scram due to Tripped Condensate Booster Pump

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	28	2007	2007-004-00			08	21	2007	FACILITY NAME	DOCKET NUMBER 0500

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
	<input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(i)(C) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(iii) <input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 366A
10. POWER LEVEL 70				

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Stephen Mazurkiewicz, Senior Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 509-377-8463
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH DAY YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On June 28, 2007 at 1717 PDT Columbia Generating Station experienced an unexpected trip of Condensate Booster Pump (CBP) 2B (COND-P-2B). The trip occurred while operators were manually transferring the COND-P-2B duplex oil filter to the standby filter. The trip of COND-P-2B resulted in a low suction pressure trip of the reactor feedwater pumps and a reactor scram on low water level.

The cause of this event was a latent equipment condition involving the incorrect configuration of the COND-P-2B lube oil filter valves combined with the operational decision to transfer filters with COND-P-2B required to be in service.

Corrective actions have been initiated to properly configure the COND-P-2B lube oil transfer valves and enhance plant documentation to ensure the proper configuration is maintained following future maintenance activities. Furthermore, Energy Northwest will enhance the operational directives governing future on-line oil filter transfers.

There are no documented previous instances at Columbia involving the inadvertent removal of CBP lube oil filters from service.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Columbia Generating Station	05000397	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2007-004-00			

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

Plant Conditions

At the time of the event, Columbia Generating Station (Columbia) was starting-up following the R-18 refueling outage. Columbia was operating in Mode 1 (Power Operation) at 70 percent power with reactor water level at +36 inches. Condensate [SD] Booster Pump [P](CBP) 2A (COND-P-2A) was out of service for maintenance. COND-P-2A being out of service with Columbia at 70% power fostered a condition where the loss of an additional CBP would require a plant shutdown.

Event Description

On June 28, 2007 at 1717 PDT Columbia experienced an unexpected trip of COND-P-2B. The trip occurred while operators were manually transferring the COND-P-2B duplex oil filter to the standby filter. This action was being performed in response to an elevated differential pressure reading across the operating filter. Concern existed that with COND-P-2A out of service, a further increase of the differential pressure across the filter would automatically trip COND-P-2B causing a reactor scram.

The lube oil system for each CBP includes an auxiliary oil pump used while the CBP is not in service, a normal oil pump used while the CBP is in service, a duplex oil cooler, a duplex oil filter, and piping to supply oil to both the pump and motor bearings. The duplex oil filter transfer mechanism consists of 3-way plug valves on the inlet and outlet of the duplex filter. Both valves are operated simultaneously via a mechanical linkage with a transfer handle. Normally during a filter transfer, the transfer handle is rotated 180 degrees and ultimately points to the in-service filter. As the handle is rotated, the plug valves will begin to port oil to the standby filter allowing it to be filled and vented. When the handle has been rotated to its mid-transfer position (i.e., 90 degrees), even oil flow is supplied to both filters. Further rotation up to 180 degrees completes the transfer to the standby filter and isolates the now out-of-service filter. With proper installation of the plug valves an oil flow path is maintained continuously throughout a transfer (i.e., make-before-break). At the time of the event, the oil filter transfer mechanism was installed in a break-before-make configuration with the valve stop ring reversed from its desired orientation. As such, the action of transferring filters created a temporary loss of oil flow to COND-P-2B and caused a pump trip on low oil pressure.

With both COND-P-2A and COND-P-2B out of service, feedwater [SJ] pumps [P] RFW-P-1A and RFW-P-1B tripped on low suction pressure. The reactor automatically scrambled on a low water level (+13 inches) immediately before a manual scram was initiated. Following the scram, the reactor water level reached -50 inches and the Main Steam [SB] Isolation Valves [V](MSIVs) closed. Reactor water level was restored using High Pressure Core Spray (HPCS)[BG] and Reactor Core Isolation Cooling (RCIC)[BN]. The reactor was maintained stable in Mode 3 with pressure control established using the Safety Relief Valves (SRVs).

The NRC was notified of the reactor scram at 1853 PDT as Event Notification # 43457.

Immediate Corrective Action

In response to this event, danger tags were hung on the filter transfer valves for all three CBPs and a night order issued instructing plant operators not to transfer any lube oil filters with either the associated CBP or auxiliary oil pump in service.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Columbia Generating Station	05000397	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		2007-004-00			

Modifications to plant operating procedures were made to provide guidance for transferring lube oil filters with both the CBPs and their associated auxiliary oil pump shutdown. The associated alarm response procedure was also revised to include guidance for investigating high lube oil differential pressure alarms as well as instructions on transferring lube oil filters.

Cause of Event

The cause of this event was a latent equipment condition involving the incorrect configuration of the COND-P-2B lube oil filter valves combined with the operational decision to transfer filters with COND-P-2B required to be in service.

From an equipment condition perspective, this event was caused by less-than-adequate configuration control for the COND-P-2B lube oil filter transfer valves. This condition was the result of an error prone valve design, a lack of proper detail in maintenance instructions, and a lack of visible and permanent alignment markings on valve components.

From an operational perspective, the crew's decision to transfer filters did not adequately assess the risk associated with performing such an operation. Prior to the transfer, no definitive determination of transient conditions was performed to establish an imminent need to perform the activity.

Assessment of Safety Consequences

This event did not pose a threat to the health and safety of the public.

With the incorrect configuration of the transfer valves, the act of rotating the transfer handle causes the oil filter outlet valve to isolate while the filter inlet remains open. This results in the positive displacement oil pump becoming deadheaded. With no relief valves between the lube oil pump and filter, the filter housing is pressurized in excess of 160 psi and can cause the pressure gauges to fail high. The maximum working pressure of the duplex filters is 150 psi; however, inspection of the housing revealed no structural deformation following this event.

The filter transfer resulted in a temporary loss of lube oil flow to COND-P-2B causing the pump to trip and feedwater to isolate. Reactor water level dropped until the low reactor water level scram setpoint (+13 inches) was reached. Coincident with the automatic scram of the reactor, the control room supervisor directed that the plant be manually scrammed. The systems necessary to support a safe shutdown were operable and performed their required functions. The reactor water level eventually reached -50 inches, causing an automatic isolation of the MSIVs. Reactor water level was restored using RCIC and HPCS with temperature and pressure control established through the Safety Relief Valves (SRVs)[SB][RV] discharging to the suppression pool. In response to increased suppression pool level, Residual Heat Removal (RHR)[BO] was aligned in the suppression pool cooling mode to compensate for SRV heat addition. The plant remained in a safe shutdown condition until corrective actions in support of restart could be performed.

Further Corrective Actions

Energy Northwest will correct the physical orientation of the lube oil transfer valve stop ring for COND-P-2B and verify that the intended make-before-break configuration is achieved. Furthermore, Energy Northwest will add the desired flow plan as well as requirements for peer verification and post-maintenance testing to the model work order for CBP duplex filter transfer valves. Additional vendor supplied information regarding the

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Columbia Generating Station	05000397	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		2007-004-00			

desired flow plan and associated configuring instructions will be added as controlled documents for the CBP filter assemblies.

Energy Northwest will revise plant operating procedures for transferring CBP oil filters to include pressure monitoring during on-line filter transfers. Energy Northwest will take further action to enhance operational decision-making processes for emergent equipment issues that fall outside the scope of formal programmatic guidance.

Energy Northwest has addressed the extent of condition. Empirical evidence indicates that the oil filter transfer valves for COND-P-2A and COND-P-2C are oriented correctly as well as those for other systems with similar configurations. However, a caution tag on COND-P-2C suggests that while the valves are correctly oriented the transfer handle is not. Energy Northwest will properly orient this transfer handle to ensure a consistent configuration among all CBP duplex oil filters.

Similar Events

There are no documented previous instances at Columbia involving the inadvertent removal of CBP lube oil filters from service. In June 2002 the lube oil transfer valves for COND-P-2A were found in the mid-transfer position. As these valves were correctly configured, both filters were in service and did not create an adverse condition. Nonetheless, these valves are common maintenance items for leakage requiring periodic disassembly. Disassembly of these valves provides the opportunity to introduce configuration errors during reassembly. The elimination of such configuration errors is an important focus of the corrective actions resulting from this event.

EIIS Information

Text Reference	System	Component
Condensate Booster Pump, COND-P-2A/B/C	SD	P
High Pressure Core Spray	BG	
Main Steam Isolation Valves	SB	V
Reactor Core Isolation Cooling	BN	
Reactor Feedwater Pump, RFW-P-1A/B	SJ	P
Residual Heat Removal	BO	
Safety Relief Valves	SB	RV